LAST ONE!

Customer gets a copy

Return this to the floor

LAST ONE!

Bio-Tek

RF302

Service Document

Package

MP-73683

Manuals in Boxes

MFG	Model	Part #	Location	Qty

History

Location	Add/Subtract	New Qty

11/26/01

RF302 SERVICE DOCUMENT PACKAGE

(P/N: ZD/RF302)
February 27, 1990

BIO-TEK INSTRUMENTS, INC.

DOCUMENT CONTROL ADMINIST

BIO-TEK® INSTRUMENTS, INC.
HIGHLAND PARK, BOX 998, WINOOSKI, VERMONT 05404-0998

RF302 SERVICE DOCUMENT PACKAGE

(PIN ZD/RF302)
February 27, 1990

Part Number	Description
3020001-PL	Shipping List
3020002-PL	RF302 Acc. Assembly
3020003-PL	Shipping Accessories
3020005-PL	RF302 Final Assembly
3020005-AS	RF302 Final Assembly
3020005-DS	RF302 Data Sheet
3020005-TP	Q.C. Final Test Procedure
3020025-FW	RF302 Calibration Software
3020025-TP	RF302 Calibration Procedure
3020100-PL	RF302 Case Assembly
3020400-SC	RF302 Schematic
3020500-PL	RF302 Front Panel Assembly
3020500-AS	RF302 Front Panel Assembly
3020502-PL	RF302 Resistor Panel Assembly
3020502-AS	RF302 Resistor Panel Assembly
3020505-PL	RF302 AM meter Assembly
3020505-AS	RF302 AM Meter Assembly
3020600-PL	RF301 Lead Set
3021000	RF302 Operators Manual

Digitized by the Internet Archive
in 2025

https://archive.org/details/manualsplus_10690

SORTED BY ASSEM

CLASS CODE: 768
SHIPPING LISTS
PART: 3020001
DESC: SHIPPING LIST UOM: EA SC:

COMPONENT PART/ REFERENCE INFO	DESCRIPTION	R
91048	BOX DIATHERMY BROWN	A
91067	FOAM PKG BP601A	A

PLANT CODE: BIO-TEK REQUESTER: WOODSS

ILL OF MATERIALS REPORT PAGE NO: 1

LY PART NUMBER, COMPONENT PART NUMBER
AS OF 03/20/95

REV: C

ITEM NUMBR	SC	ST UM	QTY PER ASSEMBLY	YIELD FACTR	OPER SEQ	OFFSET LD TIME FIXED	OFFSET LD TIME VARIABLE	EFFECTIV DATE	INACTIVE DATE
0	E3	EA	1.00	1.000	0	0	0.00	12/12/89	99/99/99
0	E3	EA	2.00	1.000	0	0	0.00	12/12/89	99/99/99

SORTED BY ASSEM

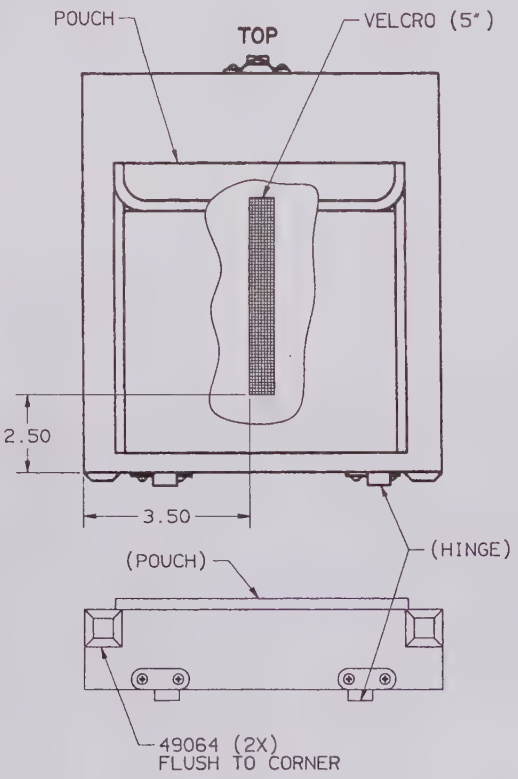
CLASS CODE: 767
SHIPPING ACCESSORY LISTS
PART: 3020003
DESC: SHIPPING ACCESSORIES UOM: EA SC:

COMPONENT PART/ REFERENCE INFO	DESCRIPTION	R
3021000	RF302 MANUAL	F
93008	TAG RF3R 100/ROLL	A
94075	SHIPPING DOCUMENT KIT	C

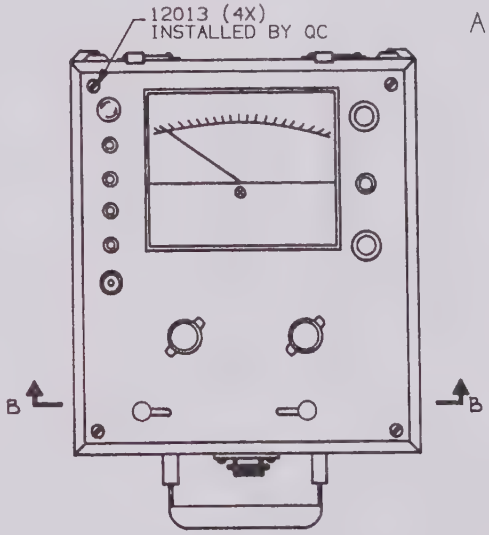
LY PART NUMBER, COMPONENT PART NUMBER
AS OF 03/20/95

9 REV: A

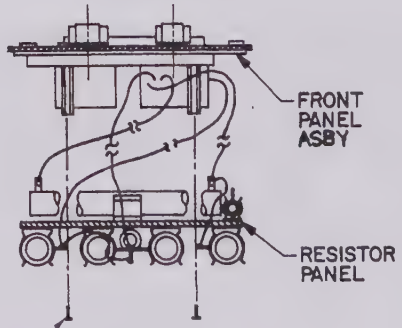
ITEM NUMBR	SC	ST UM	QTY PER ASSEMBLY	YIELD FACTR	OPER SEQ	OFFSET LD TIME FIXED	OFFSET LD TIME VARIABLE	EFFECTIV DATE	INACTIVE DATE
0	P3	EA	1.00	1.000	0	0	0.00	00/00/00	99/99/99
0	P3	PK	1.00	1.000	0	0	0.00	00/00/00	99/99/99
0	F4	EA	1.00	1.000	0	0	0.00	00/00/00	99/99/99



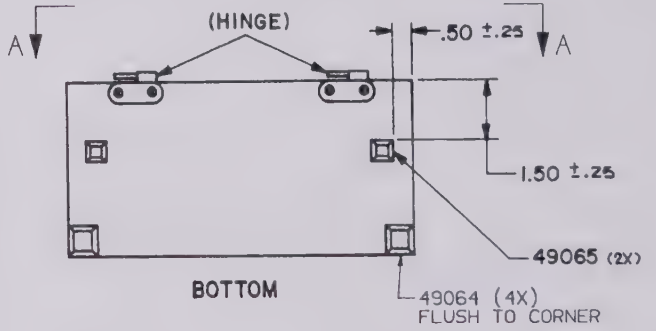
COVER ASSY

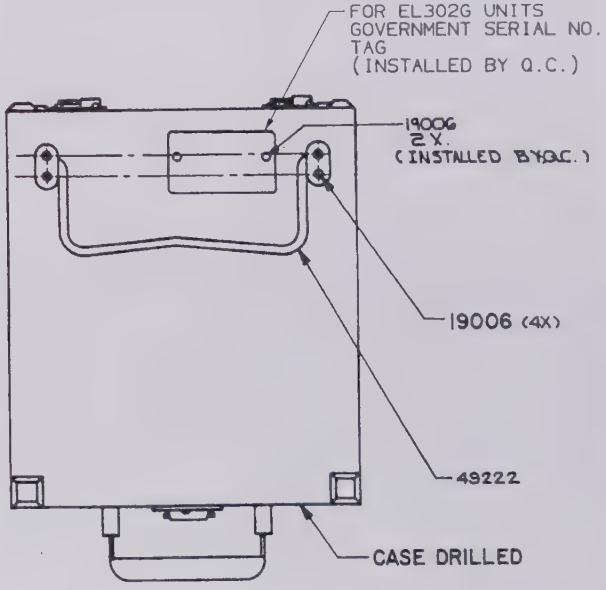


VIEW A-A
ROTATED 180°



SECTION B-B





TOP

CASE ASSY

REV	DESCRIPTION	ECO	DATE	BY
H	MOVE POUCH & VELCRO	25548	10/18/94	BPS
G	DELETE SUPERGLUE NOTE	25148	6/25/94	BPS
F	DELETE 18002:ADD 66006 TO 12005	22323	2/15/94	BPS
E	MAKE GENERIC & ADD VIEWS	14722	1/22/91	PEB
D	REMOVE FRONT PANEL ASBY PART NO.	12661	7/17/90	BLN
C	ADD GOV.SERIAL NO.TAG:ADD 19006(2X)	12594	3/7/90	JR
B	CHANGE 18019 TO 12013	10199	5/17/88	SP
A	RELEASE TO PRODUCTION	6331	3/22/88	SP

UNLESS OTHERWISE SPECIFIED
ALL DIMENSIONS ARE IN INCHES
PRODUCTION TOLERANCES
.X±.015 ANGULAR TOL.±2°
.XX±.010
.XXX±.005
SURFACE FINISH 63

MATERIAL: FINISH.

DO NOT SCALE | REMOVE ALL BURRS | BREAK SHARP EDGES

SIGNATURE		DATE
DRN BY: S.GAMBERG		3/3/88
ENGR:	D.T.A.	3/22/88
MGR	D.W.	3/22/88

THIS DOCUMENT CONTAINS CONFIDENTIAL AND PROPRIETARY INFORMATION OF BIO-TEK INSTRUMENTS INC. AND NEITHER IT NOR THE INFORMATION CONTAINED THEREIN SHALL BE DISCLOSED TO OTHERS OR DUPLICATED OR USED FOR OTHERS WITHOUT EXPRESS WRITTEN CONSENT OF BIO-TEK INSTRUMENTS INC.

THIRD ANGLE PROJECTION

BIO-TEK INSTRUMENTS, INC.
HIGHLAND PARK, BOX 998
WINOOSKI, VT. 05404-0998

TITLE.
RF302
FINAL ASBY

SIZE	DRAWING NO	REV
C	3020005-AS	H

SCALE. 1/2 SHEET 1 OF 1

CONFIDENTIAL

Bio-Tek Instruments Inc.

Model: RF302

Procedure: 3020005-DS

Data Sheet

Rev	Description	ECO	Date
A	Release to Production	10143	05/24/88
B	Change REM Load check	12980	04/17/90

Detailed Data: Date:____/___/_____ Cal. Tech:_____
W.O.#_____ Unit #: _____
Serial#:_____

1. - Meter needle zeroes: _____ ; Fuse .375 Amp used: _____
2. - Load accuracy:
   50.0 ohms 48.50_____51.50 ; 300.0 .. 297.00_____303.00
   100.0 ohms 99.00_____101.00 ; 400.0 .. 396.00_____404.00
   100.0 ohms 99.00_____101.00 ; 500.0 .. 495.00_____505.00
   200.0 ohms 198.00_____202.00
3. - Insulation Load Chassis to Ground: _____200 +/- 10 ohms
   Insulation Load Patient to Ground: _____200 +/- 10 ohms
   Insulation Load Active to Ground: _____200 +/- 10 ohms *

* Slide the ACTIVE ELECTRODE Switch

4. - REM Load Check: _____ 24.6 +/-1.2 ohms
   _____ 137.0 +/- 6.8 ohms (Push REM sw.)
5. - RETURN FAULT Capacitance: _____150 +/- 30 pf
6. - Power output (watts): CUT

Load	Actual (from step 3)	Irms(A)	P(calc)	Meter	/Irms (low cut)	P(calc)	Meter (high cut)	
50	_____	_____	7.5_____	12.5	10	_____	37.5_____	42.5 40
100	_____	_____	15.0_____	25.0	20	_____	55.0_____	65.0 60
100	_____	_____	15.0_____	45.0	30	_____	75.0_____	105.0 90
200	_____	_____	45.0_____	75.0	60	_____	165.0_____	195.0 180
300	_____	_____	75.0_____	105.0	90	_____	165.0_____	195.0 180
400	_____	_____	45.0_____	95.0	70	_____	225.0_____	275.0 250
500	_____	_____	75.0_____	125.0	100	_____	275.0_____	325.0 300

7. - Power output (watts): COAG

Load	Actual (from step 3)	Irms	P(calc)		Meter
50	_____	_____	2.5	_____ 7.5	5
100	_____	_____	15.0	_____ 25.0	20
100	_____	_____	45.0	_____ 75.0	60
200	_____	_____	45.0	_____ 75.0	60

300	_____	_____	45.0	_____75.0	60
400	_____	_____	75.0	_____125.0	100
500	_____	_____	75.0	_____125.0	100

8. - Leakage Current to Ground:

302 Setting	Meter Deflc. (mA)	DVM RMS (mv)
ACTIVE	300	30 +/- 2.5
PATIENT	300	30 +/- 2.5
CHASSIS	300	30 +/- 2.5

9. - Filter functioning properly: _____
10. - Isolated scope output checked: _____
11. - No physical damage: _____

CONFIDENTIAL

Bio-Tek Instruments, Inc.

Model: RF302, RF302G

Procedure: 3020005-TP

Q.C. Final Test Procedure

Rev	Description of Changes	ECO	Date
A	Release to Production	6330	03/22/88
B	Add word, chg step 11.0	10123	04/19/88
C	Revise steps 10 & 13	11204	01/10/89
D	Change screws from 18019 to 12013	12366	11/14/89
E	Add step 12.11	12594	03/07/90
F	Change REM load check step 10.0	12980	04/17/90
G	Add RF302G S/N Information	14521	10/02/90
H	Chg step 12.0	16245	11/26/91
I	Chg limits; Revise steps per eco	19638	03/05/93
J	Revise steps 11 & 13	25640	11/10/94

Equipment Required:

5 1/2 Digit DVM (Keithley 191,or equivalent)
Rivet Gun (for RF302G)

Detailed Procedure:

1.0 Verify each unit has a cal sheet fully completed. Verify lot # on cal sheet matches lot # on the unit.

2.0 Verify cleanliness of unit, (no scratches, dirt, glue, etc.), and that there is no obvious damage to the unit.

3.0 Bolt the unit down in the case with four 12013 screws.

4.0 Set up the RF302 as follows: Load 50 Ohms; OUTPUT POWER. Set the DVM to OHMS. Short test leads together and null lead resistance. After meter nulls, connect one lead to the ACTIVE ELECTRODE jack, and the other lead to PATIENT PLATE jack (left side).

5.0 Measure 50 ohms load, select other loads and compare to limits:

50 ohms	49.0 - 51.0 ohms
100 ohms	98.5 - 101.5 ohms
100 ohms	98.5 - 101.5 ohms
200 ohms	198.0 - 202.0 ohms
300 ohms	297.0 - 303.0 ohms
400 ohms	396.0 - 404.0 ohms
500 ohms	495.0 - 505.0 ohms

6.0 Slide the OPEN CIRCUIT/RF LEAKAGE to test and the DVM should overrange.

7.0 Select ACTIVE ELECTRODE on the 302. Move the lead from PATIENT to GROUND jack. DVM should overrange. Slide the ACTIVE ELECTRODE/RETURN FAULT to test and the DVM should read 200 +/- 10 ohms.

8.0 Select PATIENT PLATE and move lead from ACTIVE to PATIENT. DVM should read as in step 7.

9.0 Select CHASSIS and move lead from PATIENT to CHASSIS jack. DVM should read as in step 7.

10.0 Connect DVM leads between the two black jacks, it should read 24.6 +/- 1.2 ohms. Press the REM switch and the DVM should read 137.0 +/- 6.8 ohms. Disconnect DVM.

11.0 Make sure slides are not loose. Make sure RF302 pouch is attached to the outside top cover and has accessories in it. Make sure accessories match accessory parts list 3020002.

12.0 (Note: Proceed to step 12.1 for RF302G) Apply a S/N per BOM on the case bottom between the rivet holes. Apply a cal sticker below the serial number tag, record the S/N on the cal sheet.

12.1 If the work order is for RF302G's, obtain the 3021003 S/N's. Using the 3390019-ST stamping kit, stamp the quarter and year of manufacturing (use Calibration date) in the lower right corner below the phrase "Made in the USA". (Ex. 3Q90 would be stamped for the third quarter of 1990) Attach the Government S/N 3021003 to the exterior surface of the case bottom with two 19006 rivets (see 3020005-AS for tag location). Record the S/N on the cal sheet.

13.0 Place unit with pouch attached in plastic, apply a lot number sticker. Write an R & I and transfer the unit to the stock room.

NOV 1995
BTI
DOCUMENT CRTL.
APPROVED

Bio-Tek Instruments, Inc.

Model: RF302

Procedure: 3020025-TP

Calibration Procedure

Rev	Description	ECO	Date
A	Release to Production	10143	05/24/88
B	Rewrite to use 3020025-FW program. Add figures 2-4.	11492	03/21/89
C	Retype to read "DATA302"	12980	04/17/90
D	Add RF302G and change load accuracy spec	14740	01/29/91

Equipment Required:

DVM .1% Accuracy on Ohms (191 Keithley,8842A Fluke)
True RMS Voltmeter (8920A Fluke)
Current Transformer (Model 411 Pearson)
Electrosurgery Machine (ValleyLab SSE3B), or equivalent
RF302 Test Leads
Capacitor Analyzer (Sencore CA55) or equivalent
Scope with BNC to BNC Connector
Explosion Proof Foot Switch
IBM Compatible PC.
Parallel printer
3020025-FW (RF302)
3020200-FW (RF302G)

Detailed Procedure:

1.0 If you will be calibrating RF302's, insert 3020025-FW diskette in drive A. If you will be calibrating RF302G's, insert 3020200-FW diskette in drive A. Turn on computer or press Alt-Cntrl-Del if already turned on.

2.0 At the A> prompt type "RF302" if you are calibrating standard RF302's with 3020025-FW. If you are calibrating RF302G's with the 3020200-FW diskette, type "RF302G" at the A> prompt. Follow the program referring to figures 1-3 of this document for proper cable and switch configurations.

3.0 At the end of the program you will be asked if you want a hard copy. Set up printer first then type in "Y".

4.0 Date and sign data sheet and put with unit.

FIGURE 1

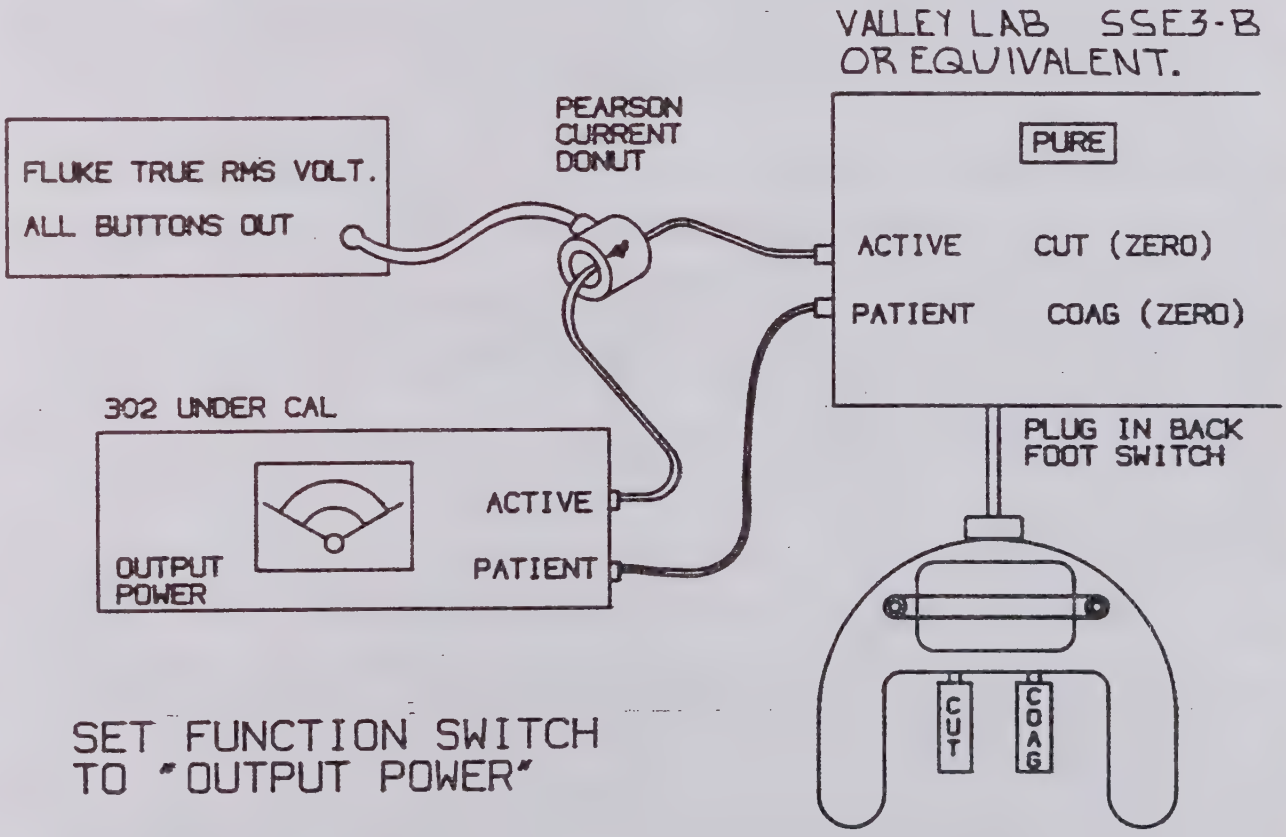
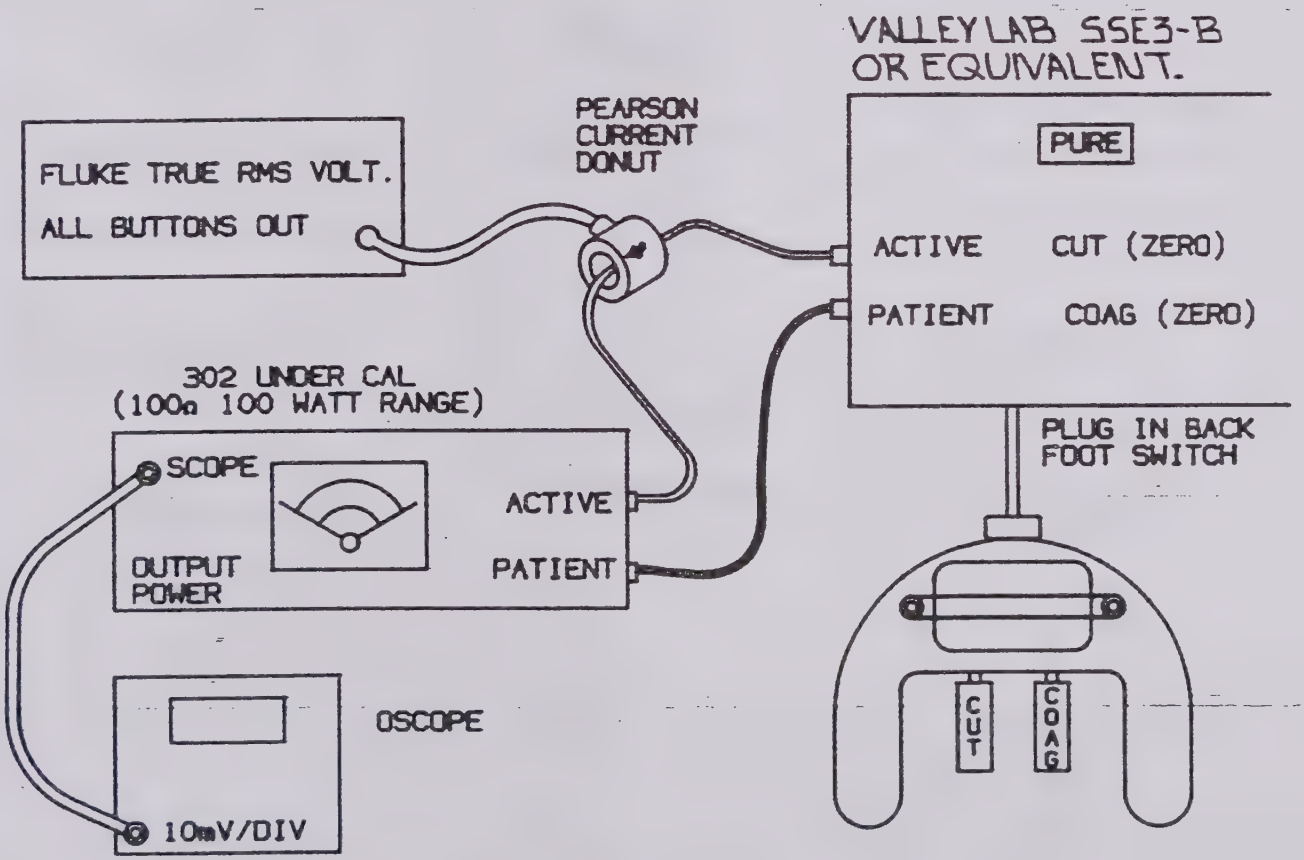
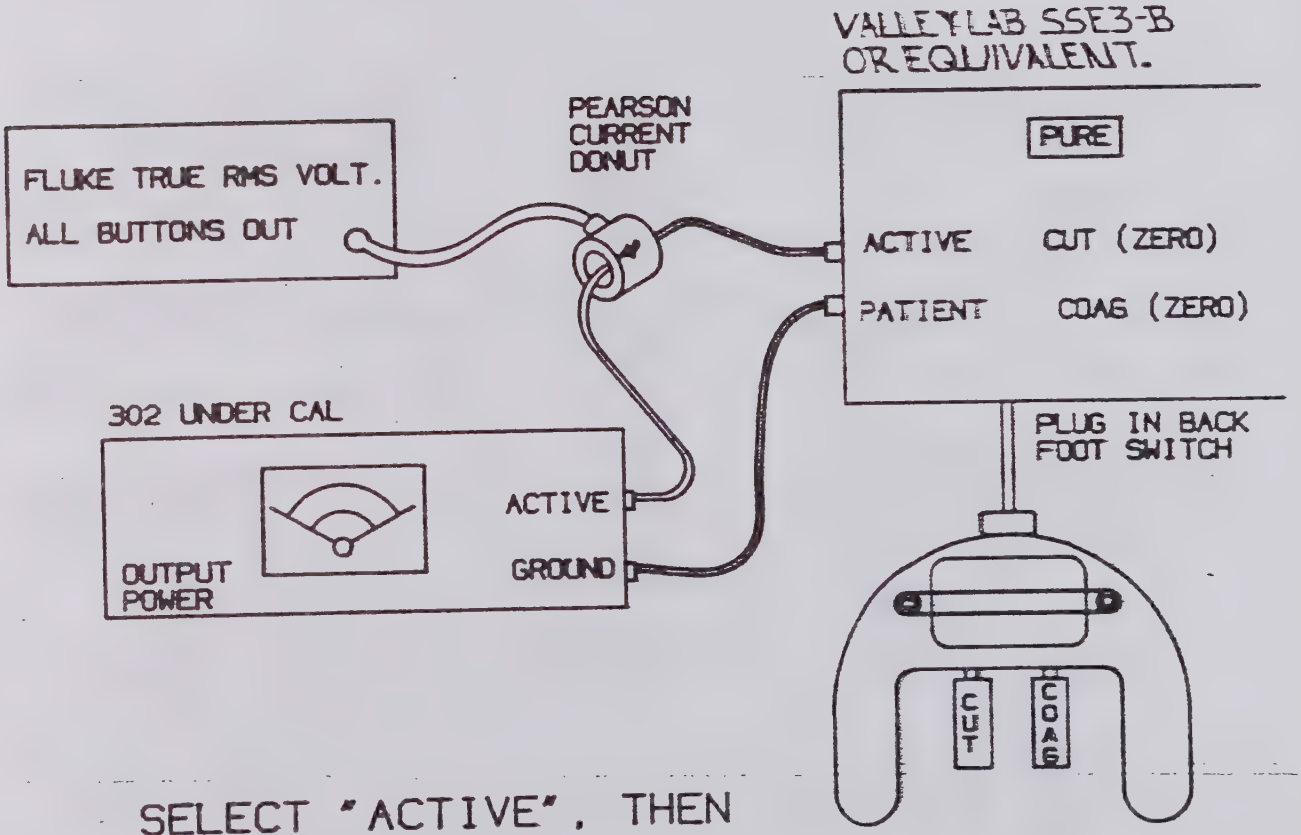

VALLEY LAB SSE3-B
OR EQUIVALENT.
PEARSON
CURRENT
DONUT
FLUKE TRUE RMS VOLT.
ALL BUTTONS OUT
PURE
ACTIVE
CUT (ZERO)
PATIENT
COAG (ZERO)
302 UNDER CAL
ACTIVE
PATIENT
OUTPUT
POWER
PLUG IN BACK
FOOT SWITCH
CUT
COAG
SET FUNCTION SWITCH
TO "OUTPUT POWER"

FIGURE 2



SET FUNCTION SWITCH
TO "OUTPUT POWER"

FIGURE 3



SELECT "ACTIVE", THEN
"PATIENT PLATE",
THEN "CHASIS".
(MOVE LEAD ALSO).
SLIDE ACTIVE ELECTRODE
SWITCH TO TEST FOR ACTIVE INPUT

SORTED BY ASSEM

CLASS CODE: 977
OBSOLETE PARTS
PART: 3020100
DESC: 302 CASE ASBY UOM: EA SC:

COMPONENT PART/ REFERENCE INFO	DESCRIPTION	R
18019	SCR PAN 8-32X1/2 BK NYLON SL	B
3022100	CASE 302 DRILLED	E
49064	FOOT RUBBER 3/16" SQ BLK	A
49065	FOOT RUBBER 9/16" SQ BLK	A
49222	TILT BAR	B

****

PLANT CODE: BIO-TEK REQUESTER: WOODSS

ILL OF MATERIALS REPORT PAGE NO: 1

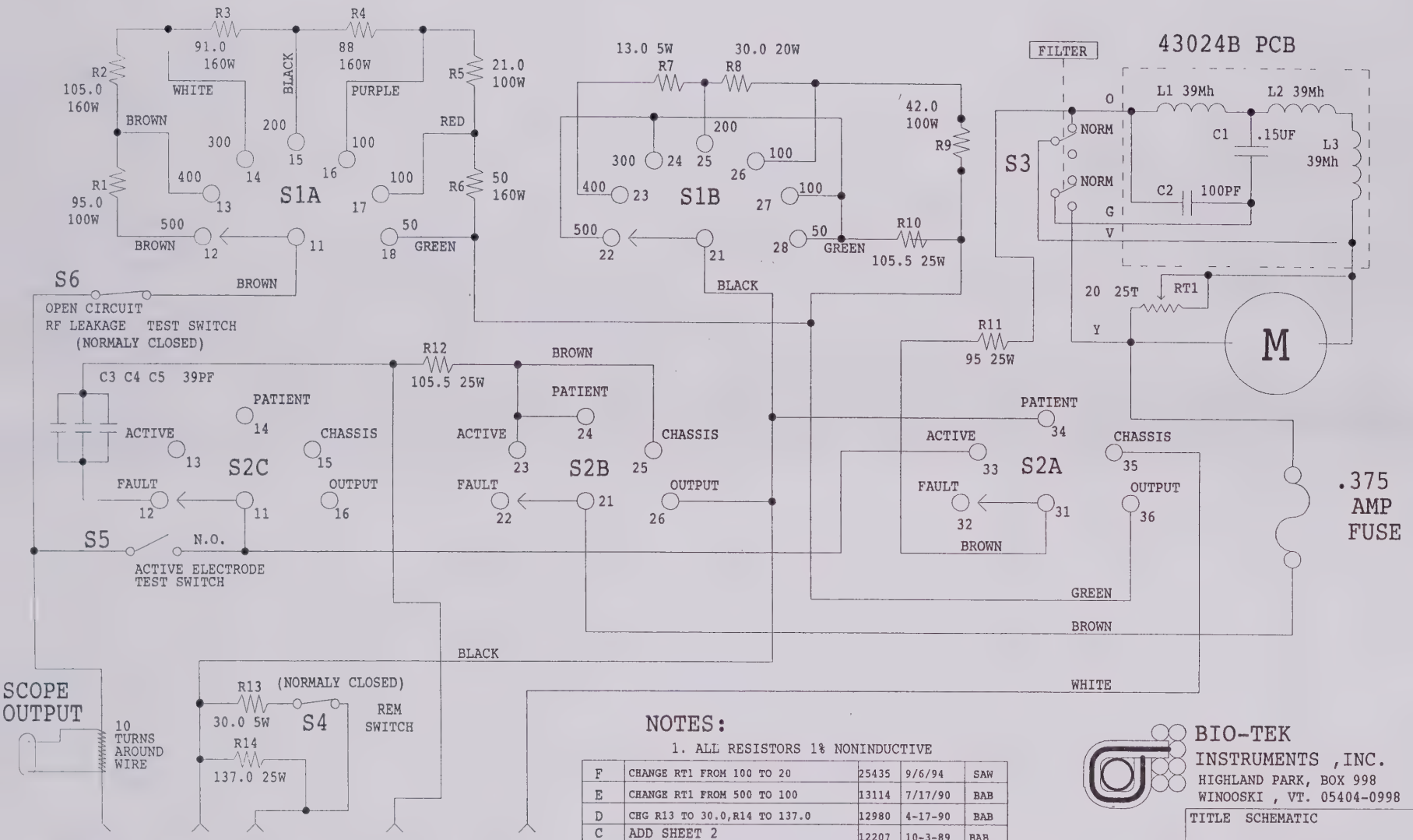
LY PART NUMBER, COMPONENT PART NUMBER

AS OF 03/21/95

Z REV:

ITEM NUMBR	SC	ST UM	QTY PER ASSEMBLY	YIELD FACTR	OPER SEQ	OFFSET FIXED	OFFSET VARIABLE	LD TIME	EFFECTIV DATE	INACTIVE DATE
0	F4	EA	4.00	1.000	0	0		0.00	00/00/00	99/99/99
0	M2	EA	1.00	1.000	0	0		0.00	00/00/00	99/99/99
0	F4	EA	6.00	1.000	0	0		0.00	00/00/00	99/99/99
0	F4	EA	2.00	1.000	0	0		0.00	00/00/00	99/99/99
0	P2	EA	1.00	1.000	0	0		0.00	00/00/00	99/99/99

********END OF REPORT**********



NOTES:

1. ALL RESISTORS 1% NONINDUCTIVE

REV	DESCRIPTION	ECO	DATE	BY
F	CHANGE RT1 FROM 100 TO 20	25435	9/6/94	SAW
E	CHANGE RT1 FROM 500 TO 100	13114	7/17/90	BAB
D	CHG R13 TO 30.0,R14 TO 137.0	12980	4-17-90	BAB
C	ADD SHEET 2	12207	10-3-89	BAB
B	ADD C4-C5 CHANGE C3	10497	8-2-88	SL
A	RELEASE TO PRODUCTION	6330	3-22-88	SL

APPROVALS	DATE
DRAWN RMG	5-87
CHECKED	

BIO-TEK
INSTRUMENTS ,INC.
HIGHLAND PARK, BOX 998
WINOOSKI , VT. 05404-0998

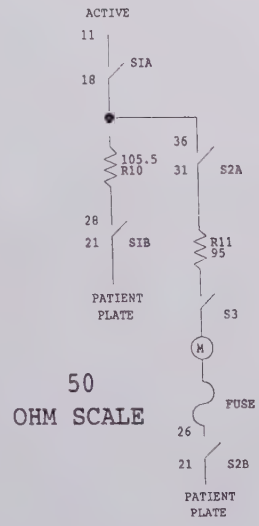
TITLE SCHEMATIC

RF302 PRODUCT SCHEMATIC

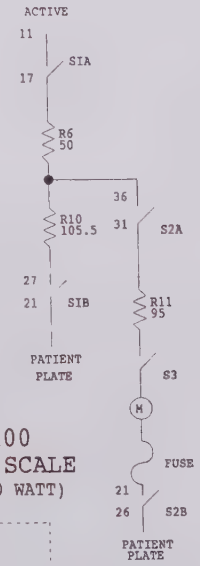
SCALE

DRAWING# 3020400-SC

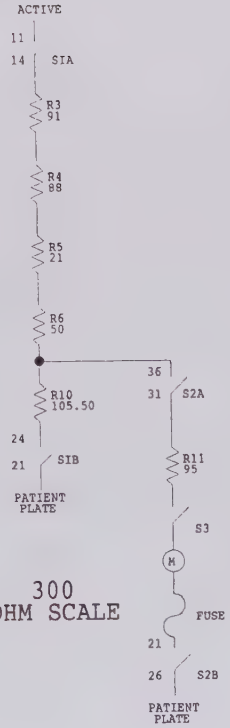
SHEET 01 OF 02



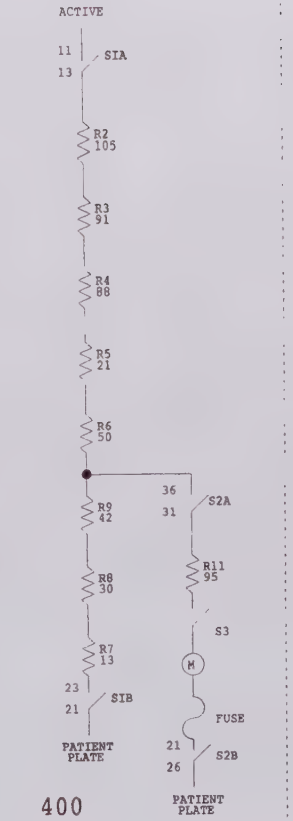
50
OHM SCALE



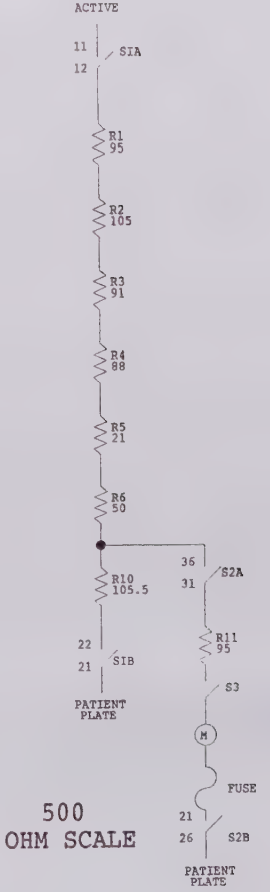
100
OHM SCALE
(100 WATT)



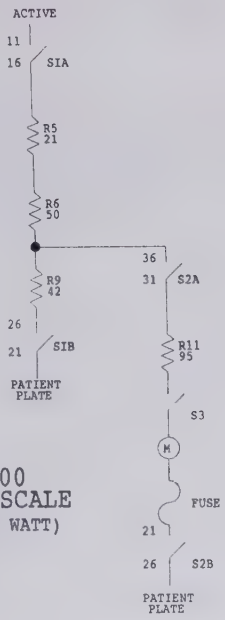
300
OHM SCALE



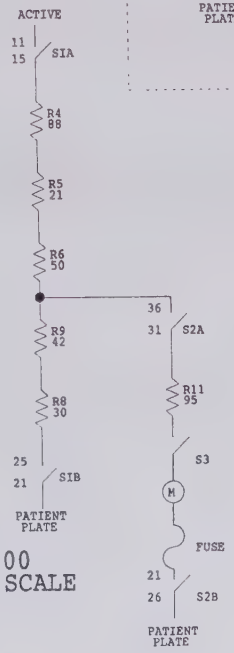
400
OHM SCALE



500
OHM SCALE



100
OHM SCALE
(300 WATT)



200
OHM SCALE

BIO-TEK
INSTRUMENTS, INC.
HIGHLAND PARK, BOX 998
WINOOSKI, VT. 05404- 0998

REV F	TITLE	RF302	
	PRODUCT SCHEMATIC		
APPROVALS	DATE		
DRAWN BAB	10-89	SCALE	DRAWING#
CHECKED		SHEET 00F 02	3020400-SC

SORTED BY ASSE

CLASS CODE: 762
PANEL ASSEMBLIES
PART: 3020500
DESC: RF302 FRONT PANEL ASBY UOM: EA SC:

COMPONENT PART/ REFERENCE INFO	DESCRIPTION	
11002	SCR FH 4-40X3/8 SS SLOT	
11018	SCR FH 2-56X1/4 SS SLOT	
12019	SCR PAN 4-40X3/16 SS SLOT	
12021	SCR PAN 4-40X5/8 SS SLOT	
14004	NUT HEX 6-32 STEEL	
14006	NUT HEX 10-32 SS	
14013	NUT FLAT, FOR FUSEHLDR 46010	
15006	LOCKNUT 10-32 SST	
16003	LKWSHR #6 HELICAL SPR SS	
17025	WSHR FLAT .477X.625 STEEL	
301B009	MOUNT REED RELAY	
301B013	NUT DRESS BLACK ACETAL	
301B020	REED SWITCH SLIDER BAR	
301B021	REED SWITCH SLIDER PEG	
3020505 M	RF302 AMMETER ASBY	
3021001	OVRLY RF302 FRNT PL	
3022501	PANEL, FRONT, RF302	
33059 R7,13	RES 13.0 OHM 1% 5W NI WW	
33061 R14	RES 50.0 OHM 1% 25W NI WW	
33063 R12	RES 105.5 OHM 1% 25W NI WW	
35024 RT1	TRIMPOT 500 OHM, 25T	
42001	BANANA JACK RED	
42002	BANANA JACK BLACK	

PLANT CODE: BIO-TEK REQUESTER: WOODSS

BILL OF MATERIALS REPORT PAGE NO: 1

BLY PART NUMBER, COMPONENT PART NUMBER
AS OF 01/01/90

X1 REV: D

ITEM NUMBR	SC	ST UM	QTY PER ASSEMBLY	YIELD FACTR	OPER SEQ	OFFSET FIXED	OFFSET VARIABLE	LD TIME	EFFECTIV DATE	INACTIVE DATE
0	F4	EA	4.00	1.000	0	0		0.00	00/00/00	01/10/95
0	F4	EA	2.00	1.000	0	0		0.00	12/15/87	01/10/95
0	F4	EA	4.00	1.000	0	0		0.00	12/15/87	01/10/95
0	F4	EA	2.00	1.000	0	0		0.00	10/09/87	01/10/95
0	F4	EA	4.00	1.000	0	0		0.00	00/00/00	10/26/94
0	F4	EA	2.00	1.000	0	0		0.00	03/22/88	09/06/94
5	F4	EA	1.00	1.000	0	0		0.00	09/06/88	01/10/95
0	F4	EA	2.00	1.000	0	0		0.00	03/22/88	09/06/94
0	F4	EA	4.00	1.000	0	0		0.00	00/00/00	10/26/94
0	F4	EA	2.00	1.000	0	0		0.00	12/15/87	01/10/95
0	M2	EA	1.00	1.000	0	0		0.00	00/00/00	01/10/95
0	M2	EA	2.00	1.000	0	0		0.00	00/00/00	01/10/95
0	M2	EA	2.00	1.000	0	0		0.00	00/00/00	01/10/95
0	M2	EA	2.00	1.000	0	0		0.00	00/00/00	01/10/95
0	X1	EA	1.00	1.000	0	0		0.00	00/00/00	09/06/94
0	P3	EA	1.00	1.000	0	0		0.00	00/00/00	02/24/94
0	M2	EA	1.00	1.000	0	0		0.00	00/00/00	02/24/94
0	P2	EA	2.00	1.000	0	0		0.00	00/00/00	04/17/90
0	P2	EA	1.00	1.000	0	0		0.00	00/00/00	04/17/90
0	P2	EA	1.00	1.000	0	0		0.00	00/00/00	01/10/95
0	P2	EA	1.00	1.000	0	0		0.00	00/00/00	07/17/90
0	P2	EA	1.00	1.000	0	0		0.00	00/00/00	01/10/95
0	P2	EA	2.00	1.000	0	0		0.00	00/00/00	01/10/95

CLASS CODE: 762
PANEL ASSEMBLIES
PART: 3020500
DESC: RF302 FRONT PANEL ASBY UOM: EA SC: X1

COMPONENT PART/ REFERENCE INFO	DESCRIPTION	RV
42003	BANANA JACK WHITE	A
42004	BANANA JACK GREEN	A
42006	BNC CHASSIS SINGLE	A
42031	TERM RING 3/8 22-16 GA	A
42033	TERM RING #6 22-16 GA	A
42036	TERM RING #6 16-14 GA INS	A
43024	PCB 301B	B
45002	KNOB BLACK DIAL POINT	A
45057	SPCR FF 4-40X2.00 AL HX	A
46010	FUSEHOLDER 8AG	A
46047	FUSE, 3/8AMP 8AG	A
49014	TERM PCB	A
49037	SPRING .180 OD 1.25 FREE L	A
49038	MAGNET	A
49049	CLIP,SPRING .560ID .025TK	A
49362	CLIP,SPRING .312ID .012TK	A
51006 S1,2	SW RJT 8-POS 3-POLE POWER	A
51010	JUMPER POS-POS FOR 51006	A
51011	JUMPER DEC-DEC FOR 51006	A
52007 S3,4	SW PB DPDT HIGH VOLTAGE	A
56001 S5,6	SW REED HIGH VOLT	A
63001 L1-3	INDUCTOR 39uH	A
66008 A/R	SUPERGLUE	A

Y PART NUMBER, COMPONENT PART NUMBER
AS OF 01/01/90

REV: D

ITEM NUMBR	ST SC	UM	QTY PER ASSEMBLY	YIELD FACTR	OPER SEQ	OFFSET FIXED	OFFSET VARIABLE	EFFECTIV DATE	INACTIVE DATE
0	P2	EA	1.00	1.000	0	0	0.00	00/00/00	01/10/95
0	P2	EA	1.00	1.000	0	0	0.00	00/00/00	01/10/95
0	P2	EA	1.00	1.000	0	0	0.00	00/00/00	01/10/95
0	P4	EA	1.00	1.000	0	0	0.00	00/00/00	01/10/95
0	P4	EA	1.00	1.000	0	0	0.00	12/15/87	01/10/95
4	P4	EA	30.00	1.000	0	0	0.00	03/22/88	01/22/91
0	P4	EA	1.00	1.000	0	0	0.00	00/00/00	01/10/95
0	P2	EA	2.00	1.000	0	0	0.00	00/00/00	01/10/95
0	P2	EA	4.00	1.000	0	0	0.00	00/00/00	01/10/95
0	P2	EA	1.00	1.000	0	0	0.00	00/00/00	01/10/95
0	P2	EA	1.00	1.000	0	0	0.00	00/00/00	01/10/95
0	P4	EA	4.00	1.000	0	0	0.00	00/00/00	01/10/95
0	P4	EA	1.00	1.000	0	0	0.00	00/00/00	01/10/95
0	P2	EA	2.00	1.000	0	0	0.00	00/00/00	01/10/95
0	P2	EA	2.00	1.000	0	0	0.00	00/00/00	01/10/95
0	P2	EA	2.00	1.000	0	0	0.00	00/00/00	01/10/95
0	P2	EA	2.00	1.000	0	0	0.00	00/00/00	01/10/95
3	P2	EA	9.00	1.000	0	0	0.00	03/22/88	01/22/91
0	P2	EA	3.00	1.000	0	0	0.00	12/15/87	01/10/95
0	P2	EA	2.00	1.000	0	0	0.00	00/00/00	01/10/95
0	P2	EA	2.00	1.000	0	0	0.00	00/00/00	01/10/95
0	P2	EA	3.00	1.000	0	0	0.00	00/00/00	01/10/95
0	E4	EA	0.00	1.000	0	0	0.00	03/22/88	06/15/94

SORTED BY ASSEM

CLASS CODE: 762
PANEL ASSEMBLIES
PART: 3020500
DESC: RF302 FRONT PANEL ASBY UOM: EA SC:

COMPONENT PART/ REFERENCE INFO	DESCRIPTION	R
67008 .3"	TAPE FOAM MTG 1/2W 1/32TH	A
71002 12"	WIRE HOOK-UP 14 AWG	B
71007 128.5"	WIRE HOOK-UP 16 AWG	C
71023 .5"	SHRINK TUBE 1/16"	A
71024 2.25"	SHRINK TUBE 1/8"	A
83002 C2	CAP 100 pF 1000V DISC	A
83016 C3,C4,C5	CAP 47 pF 6 KU DISK	B
84004 C1	CAP .15 uF 250V FOIL	A

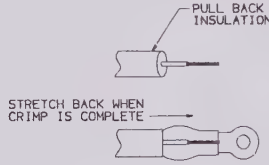
LY PART NUMBER, COMPONENT PART NUMBER
AS OF 01/01/90

1 REV: D

ITEM NUMBR	SC	ST UM	QTY PER ASSEMBLY	YIELD FACTR	OPER SEQ	OFFSET LD TIME FIXED	OFFSET LD TIME VARIABLE	EFFECTIV DATE	INACTIVE DATE
2	F4	FT	0.03	1.000	0	0	0.00	03/22/88	09/06/94
0	F4	FT	1.00	1.000	0	0	0.00	02/07/89	01/22/91
0	F4	FT	10.70	1.000	0	0	0.00	02/07/89	01/22/91
1	F4	FT	0.05	1.000	0	0	0.00	03/22/88	01/22/91
0	F4	FT	0.20	1.000	0	0	0.00	03/22/88	01/22/91
0	P2	EA	1.00	1.000	0	0	0.00	00/00/00	01/10/95
0	P2	EA	3.00	1.000	0	0	0.00	08/02/88	01/10/95
0	P2	EA	1.00	1.000	0	0	0.00	00/00/00	01/10/95

NOTES:

1. ENDS WITHOUT CONNECTOR SHALL BE STRIPPED .50" AND TINNED, EXCEPT [AC].
2. WIRE TOLERANCE ±.5" UNLESS OTHERWISE SPECIFIED AND REPRESENTS CUT LENGTH.
3. ALL WIRE QUANTITIES ARE 1.00 PER UNIT EXCEPT: A,E,K,M,O,Z ARE 2.00; V AND X ARE 3.00.
4. CRIMP ON INNER INSULATION, (SEE DETAIL A) OUTER INSULATION MUST BUTT AGAINST CRIMP END.



DETAIL A

A	42034 42034	71078-RED-2.0"
B	42034 42034	71078-RED-2.5"
C	42034	71082-WHITE-12.5"
D	42034	71076-BLACK-1.75"
E	42034	71076-BLACK-8.0"
F	42034	71081-VIOLET-10.0"
G	42034	71081-VIOLET-12.5"
H	42034	71078-RED-10.0"
I	42034	71080-GREEN-8.0"
J	42034	71076-BLACK-5.5"
K	42034	71077-BROWN-8.0"
L	42034	71080-GREEN-6.0"
M	42034	71077-BROWN-2.5"
N	42034	71077-BROWN-7.5"
O	42034	71077-BROWN-3.5"
P	42034	71082-WHITE-7.5"
Q	42034	71076-BLACK-6.0"
R	42034	71077-BROWN-5.0"
S		71077-BROWN-2.5"
T		71077-BROWN-7.5"
U		71079-YELLOW-8.5"
V		71079-YELLOW-6.5"
W		71079-YELLOW-5.5"
X		71079-YELLOW-5.0"
Y		71076-BLACK-7.5"
Z		71076-BLACK-6.0"
AA	42034 42034	71080-GREEN-8.0"
AB	42034 42034	71076-BLACK-5.5"
AC	42031	71108-BLUE-12.0"

ADD .5" OF SHRINK TUBE 71024 AFTER SOLDERING RING TO WIRE.

REV	DESCRIPTION	ECO	DATE	BY
L	CHG METER HARDWARE & METER	25815	10/28/94	BPS
K	DELETE #11 & NOTE1	25411	9/8/94	BPS
J	CHG PER ECO	25150	8/25/94	BPS
I	ADD NOTE 4 & DETAIL A	22323	2/15/94	BPS
H	CHG 71005 TO 71108 ADD NOTES	20009	4-8-93	CD
G	ADD SHEET 1; CHANGE PER ECO	14732	1/22/91	BLH
F	REMOVE METER ASBY PART NO	12861	7-17-90	BLH
E	CHANGE WIRE LENGTHS	11404	2-7-89	BLH
D	ADD "-BLACK" TO SHEET 1	10978	11-13-88	BLH
C	ADD 14013 NUT	10825	9-8-88	BLH
B	REDRAW (1) TO SHOW (2) C4 CAPS	10497	6-2-88	BLH
A	RELEASE TO PRODUCTION	8331	3-22-88	S.

UNLESS OTHERWISE SPECIFIED
ALL DIMENSIONS ARE IN INCHES
PRODUCTION TOLERANCES
ANGULAR TOL ±2°
.X± .015
.XX± .010
.XXX± .005
SURFACE FINISH 63
MATERIAL
FINISH
BIO TEK P/N
DO NOT SCALE
REMOVE ALL BURRS
BREAK SHARP EDGES

SIGNATURE DATE
DRAWN BY: D. VEDITTI 12-13-90
ENGR:
MFG:

THIS DRAWING CONTAINS CONFIDENTIAL AND PROPRIETARY INFORMATION OF BIO-TEK INSTRUMENTS, INC. AND NEITHER IT NOR THE INFORMATION CONTAINED THEREIN SHALL BE DISCLOSED TO OTHERS OR DUPLICATED OR USED FOR ANY PURPOSE WHATSOEVER WITHOUT THE PRIOR WRITTEN CONSENT OF BIO-TEK INSTRUMENTS, INC.

THIRD ANGLE PROJECTION

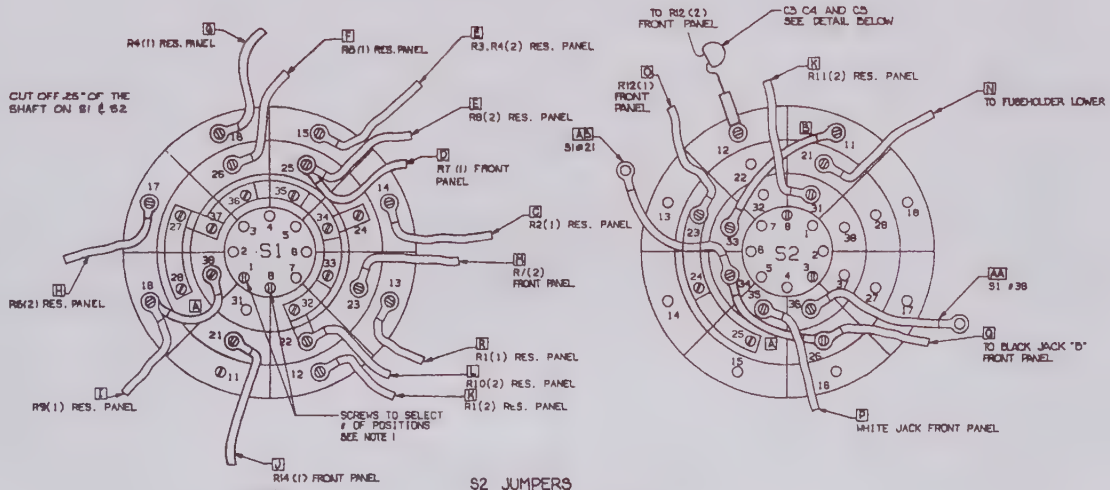
BIO-TEK INSTRUMENTS, INC
WINOOSKI PARK, BOX 998
WINOOSKI, VT. 05404-0998

TITLE: RF 302 FRONT PANEL ASBY

SIZE: D | DRAWING NO: 3020500-AS | REV: L

SCALE: NONE | SHEET 1 OF 3

3	L
2	K
1	L
SHEET	REV



S1 JUMPERS

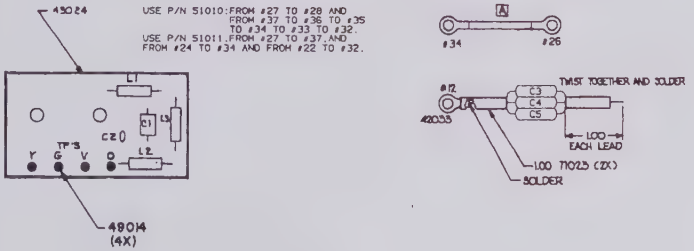
A
#18 #38

S2 JUMPERS

USE P/N 51010 FROM #23 TO #24 TO #25

B
#11 #33

A
#34 #26



NOTES:

1. PRIOR TO INSTALLING SCREWS,USE PLIERS AND VIEWING SWITCH FROM BACK-ROTATE SWITCH UNTIL LEVER IS BETWEEN POSITIONS 3 AND 4. AFTER INSTALLING SCREWS,ROTATE AND CHECK SWITCHES: 7 POSITIONS FOR S1 5 POSITIONS FOR S2
2. ORIENTATION OF WIRES MUST BE OBSERVED.

INTERPRET IAW ANSI Y14.5-82

UNLESS OTHERWISE SPECIFIED | SIGNATURE | DATE

ALL DIMENSIONS ARE IN INCHES | DRAWN BY | S.Y. | 1.19.88

PRODUCTION TOLERANCES

.XX ±.03 .XXX ±.010 SURFACE FINISH 63

MATERIAL

BIO-TEK INSTRUMENTS, INC.

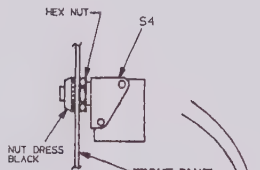
TITLE

RF302 FRONT PANEL ASBY

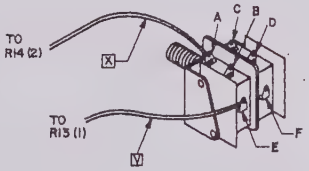
SIZE D | DRAWING NO 3020500-AS | REV K

NOTES FOR S3,S4 INSTALLATION

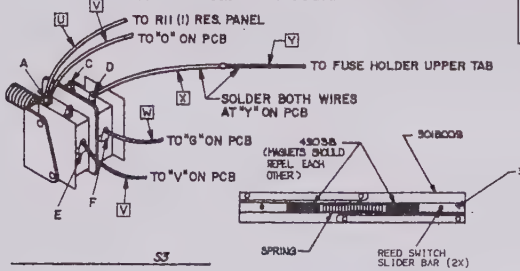
1. INSTALL SWITCHES AFTER BLACK JACK.
2. TURN HEX NUT ALL THE WAY DOWN.
3. PUT SWITCH THROUGH FRONT PANEL.
4. TIGHTEN DRESS NUT DOWN.
5. TIGHTEN HEX NUT AGAINST BACK OF PANEL WITH WRENCH.



VIEW A-A
(SAME AS S3)

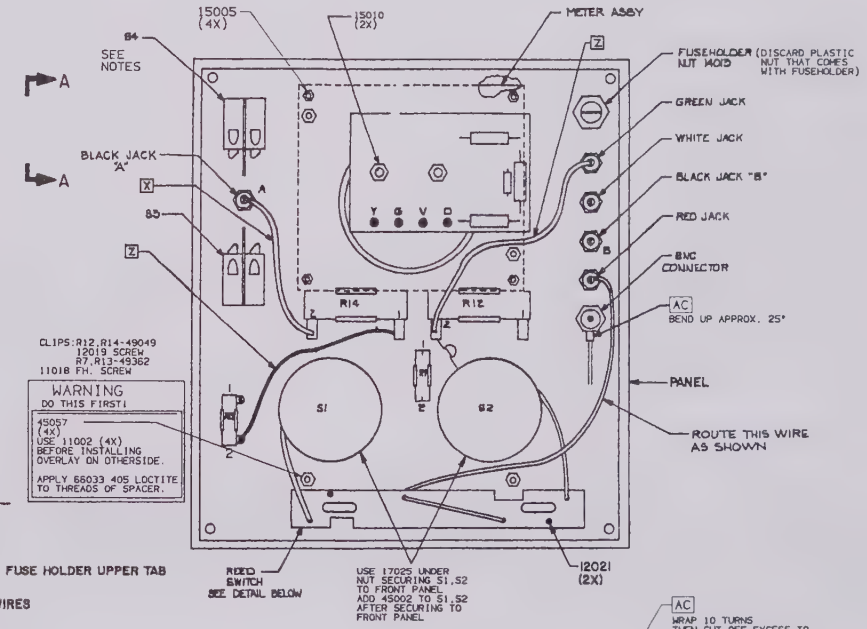


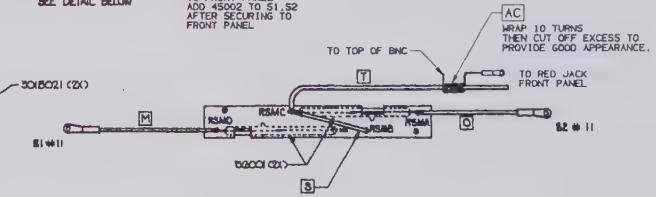
S4
(VIEW ROTATED)



S3

TOP VIEW
INSIDE ASSEMBLY





REED SWITCH

NOTES:

1. OBSERVE ORIENTATION OF REED SWITCH MOUNT.
2. WHEN INSTALLING THE REED SWITCH,FIRST INSTALL THE LEFT SIDE REED SWITCH SLIDER BAR AND PEG. THEN PLACE THE REED SWITCH MOUNT OVER THE SLIDER BAR AND INSTALL BOTH 12021 SCREWS. PUSH MAGNETS AND SPRING INTO MOUNT(MAGNETS SHOULD REPEL EACH OTHER). PLACE THE OTHER SLIDER BAR INTO THE RIGHT END OF THE MOUNT AND PUSH IN THE SECOND PEG.

UNLESS OTHERWISE SPECIFIED	SIGNATURE	DATE
ALL DIMENSIONS ARE IN INCHES PRODUCTION TOLERANCES .XX ±.015 ANGULAR TOL ±2° .XXX ±.010 .XXXX ±.005 SURFACE FINISH 63	DRN BH	1-27-88
	ENGR	
	MGR	
MATERIAL	FINISH	
DO NOT SCALE	REMOVE ALL BURRS	BREAK SHARP EDGES

THIS DOCUMENT CONTAINS CONFIDENTIAL AND PROPRIETARY INFORMATION OF B-K PRECISION, INC. AND NEITHER IT NOR THE INFORMATION CONTAINED HEREIN SHALL BE DISCLOSED TO OTHERS OR USED IN ANY MANNER WHATSOEVER WITHOUT EXPRESS WRITTEN CONSENT OF B-K PRECISION, INC.

THIRD ANGLE PROJECTION

BIO-TEK INSTRUMENTS, INC

TITLE: RF302 FRONT PANEL ASBY

SIZE: D | DRAWING NO: 3020500-AS | REV: L

SCALE: NONE | SHEET 3 OF 3

SORTED BY ASSEM

CLASS CODE: 762
PANEL ASSEMBLIES
PART: 3020502
DESC: RF302 RESISTOR PANEL ASBY UOM: EA SC:

COMPONENT PART/ REFERENCE INFO	DESCRIPTION	R
12004	SCR PAN 4-40X1/4 SS SLOT	A
14003	NUT HEX 4-40 STEEL	A
16002	LKWSHR #4 HELICAL SPR SS	A
3022502	PANEL, RESISTOR, RF302	B
33060 R8	RES 30.0 OHM 1% 20W NI WW	A
33062 R11	RES 95.0 OHM 1% 25W NI WW	A
33063 R10	RES 105.5 OHM 1% 25W NI WW	A
33064 R5	RES 21.0 OHM 1% 100W NI WW	A
33065 R9	RES 42.0 OHM 1% 100W NI WW	A
33066 R1	RES 95.0 OHM 1% 100W NI WW	A
33067 R6	RES 50.0 OHM 1% 160W NI WW	A
33068 R4	RES 88.0 OHM 1% 160W NI WW	A
33069 R3	RES 91.0 OHM 1% 160W NI WW	A
33070 R2	RES 105.0 OHM 1% 160W NI WW	A
49048	CLIP,SPRING .770ID .025TK	A
49049	CLIP,SPRING .560ID .025TK	A
49363	CLIP,SPRING .440ID .020TK	A
49364	CLIP,SPRING 1.120ID .032TK	A

****

PLANT CODE: BIO-TEK REQUESTER: WOODSS

ILL OF MATERIALS REPORT PAGE NO: 1

LY PART NUMBER, COMPONENT PART NUMBER

AS OF 01/01/90

1 REV: A

ITEM NUMBR	ST SC	UM	QTY PER ASSEMBLY	YIELD FACTR	OPER SEQ	OFFSET FIXED	LD TIME VARIABLE	EFFECTIV DATE	INACTIVE DATE
0	F4	EA	28.00	1.000	0	0	0.00	00/00/00	08/07/90
0	F4	EA	28.00	1.000	0	0	0.00	00/00/00	08/07/90
0	F4	EA	28.00	1.000	0	0	0.00	00/00/00	08/07/90
0	M2	EA	1.00	1.000	0	0	0.00	00/00/00	01/10/95
0	P2	EA	1.00	1.000	0	0	0.00	00/00/00	01/10/95
0	P2	EA	1.00	1.000	0	0	0.00	00/00/00	01/10/95
0	P2	EA	1.00	1.000	0	0	0.00	00/00/00	01/10/95
0	P2	EA	1.00	1.000	0	0	0.00	00/00/00	01/10/95
0	P2	EA	1.00	1.000	0	0	0.00	00/00/00	01/10/95
0	P2	EA	1.00	1.000	0	0	0.00	00/00/00	01/10/95
0	P2	EA	1.00	1.000	0	0	0.00	00/00/00	01/10/95
0	P2	EA	1.00	1.000	0	0	0.00	00/00/00	01/10/95
0	P2	EA	1.00	1.000	0	0	0.00	00/00/00	01/10/95
0	P2	EA	1.00	1.000	0	0	0.00	00/00/00	01/10/95
0	P2	EA	3.00	1.000	0	0	0.00	00/00/00	01/10/95
0	P2	EA	2.00	1.000	0	0	0.00	00/00/00	01/10/95
0	P2	EA	1.00	1.000	0	0	0.00	00/00/00	01/10/95
0	P2	EA	6.00	1.000	0	0	0.00	00/00/00	01/10/95

********END OF REPORT********

AD QTY 1

71076-BLACK-3.0"

AE QTY 1

71076-BLACK-1.5"

AF QTY 1

71076-BLACK-4.0"

AG QTY 1

71076-BLACK-3.5"

AH QTY 2

71079-YELLOW-1.5"

AI QTY 1

71080-GREEN-9.5"

NOTES:

1. ENDS SHALL BE STRIPPED .50" AND TINNED.

INTERPERT DWG IAW ANSI Y14.5M-82

REV	DESCRIPTION	ECO	DATE	BY
D	DELETE CABLE AJ:CHG AH QTY	25147	6/7/94	BPS
C	ADD SHEET 1; CHANGE PER ECO	14722	01-22-91	BLN
B	ADD & DELETE NOTES	14025	8-7-90	BLN
A	RELEASE TO PRODUCTION	6331	3-22-88	SL

UNLESS OTHERWISE SPECIFIED
ALL DIMENSIONS ARE IN INCHES
PRODUCTION TOLERANCES
.X±.015 ANGULAR TOL.±2°
.XX±.010
.XXX±.005
SURFACE FINISH 63

MATERIAL
FINISH
810-TEK P/N:
DO NOT SCALE
REMOVE ALL BURRS
BREAK SHARP EDGES

SIGNATURE	DATE
DRAWN BY:D.VENDITTI	12-18-90
ENGR:	
MGR:	

THIS DOCUMENT CONTAINS CONFIDENTIAL AND PROPRIETARY INFORMATION OF BIO-TEK INSTRUMENTS INC AND NEITHER IT NOR THE INFORMATION CONTAINED THEREIN SHALL BE DISCLOSED TO OTHERS OR DUPLICATED OR USED FOR OTHERS WITHOUT EXPRESS WRITTEN CONSENT OF BIO-TEK INSTRUMENTS INC.

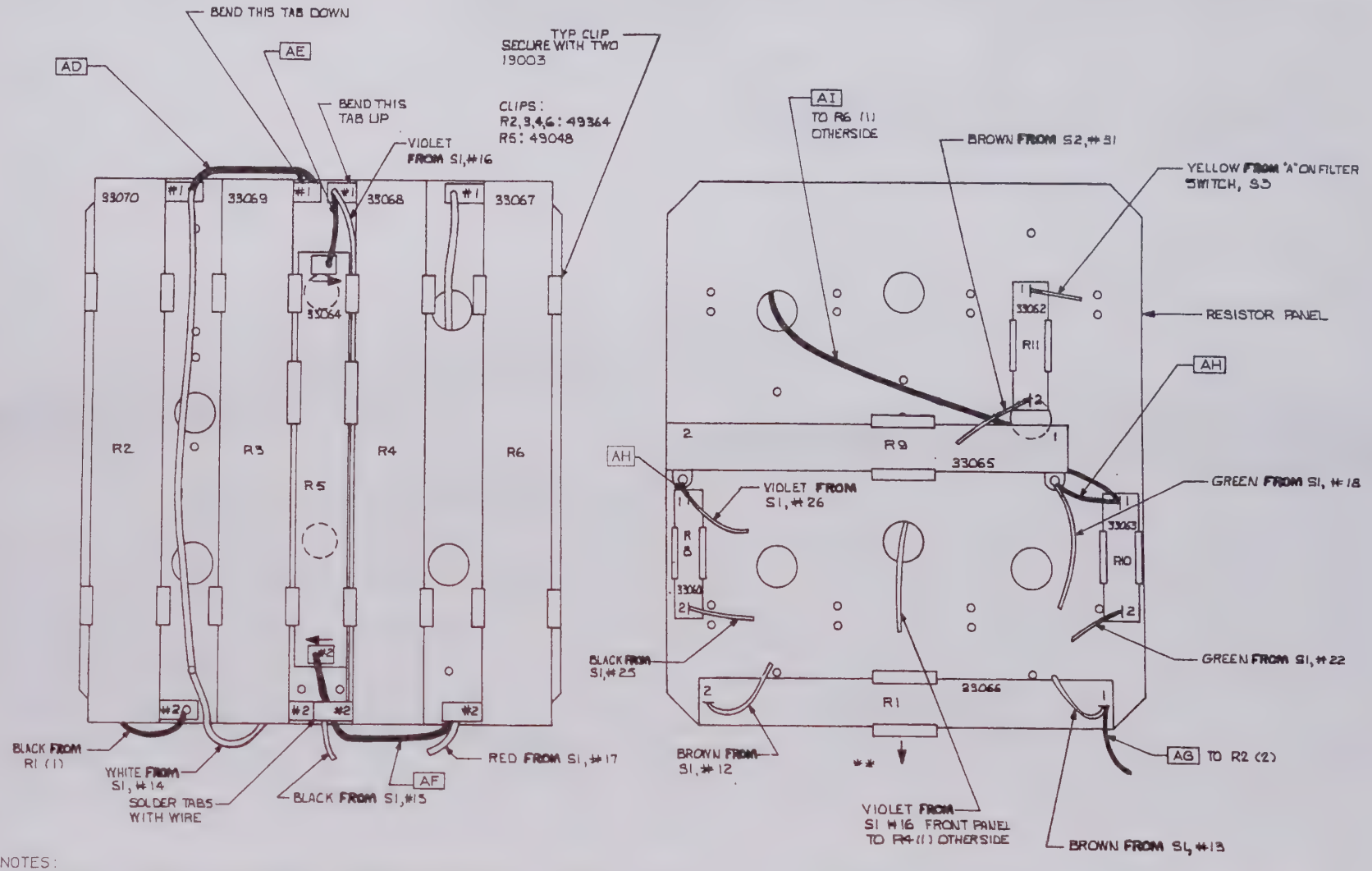
THIRD ANGLE PROJECTION

BIO-TEK INSTRUMENTS, INC.
HIGHLAND PARK, BOX 998
WINOOSKI, VT. 05404-0998

TITLE
RF302 RESISTOR PANEL ASBY

SIZE C | DRAWING NO. 3020502-AS | REV D

SCALE: NONE | SHEET 1 OF 2



NOTES:

CHECK LARGE HOLE PATTERNS TO DECIDE WHICH SIDE TO INSTALL CLIPS.
INSTALL R5 FIRST BEND TABS ACCORDING TO ARROW.
**WHEN INSTALLING CLIP FOR R1, PULL CLIP IN THE DIRECTION OF THE ARROW AND RIVET TO BOARD.
CLIPS: R1,R9:49048
R10,R11:49049
R8:49363
USE 19003 ON ALL CLIPS.
INSERT RIVET THROUGH RESISTOR PANEL FIRST THEN THROUGH THE CLIP.

INTERPRET IAW ANSI Y14.5-82

UNLESS OTHERWISE SPECIFIED
ALL DIMENSIONS ARE IN INCHES
PRODUCTION TOLERANCES
.X±.015 ANGULAR TOL ±2°
.XX±.010
.XXX±.005
SURFACE FINISH 63

SIGNATURE	DATE
DRN BY: B.L.N.	1/24/88
ENGR: Q.J.A.	3/22/88
M.K.	3/22/88

MATERIAL: FINISH:

DO NOT SCALE | REMOVE ALL BURRS | BREAK SHARP EDGES

THIS DOCUMENT CONTAINS CONFIDENTIAL AND PROPRIETARY INFORMATION OF BIO-TEK INSTRUMENTS INC. AND NEITHER IT NOR THE INFORMATION CONTAINED THEREIN SHALL BE DISCLOSED TO OTHERS OR DUPLICATED OR USED FOR OTHERS WITHOUT EXPRESS WRITTEN CONSENT OF BIO-TEK INSTRUMENTS INC.

THIRD ANGLE PROJECTION

BIO-TEK INSTRUMENTS, INC.
HIGHLAND PARK, BOX 998
WINOOSKI, VT. 05404-0998

TITLE: **RF302 RESISTOR PANEL ASBY**

SIZE	DRAWING NO.	REV
C	3020502-AS	D

SCALE: 1/1 SHEET 2 OF 2

SORTED BY ASSEM

CLASS CODE: 685
METERS & GAUGES
PART: 3020505
DESC: RF302 AMMETER ASBY UOM: EA SC:

COMPONENT PART/ REFERENCE INFO	DESCRIPTION	R
14012	NUT HEX 6-32 SS	A
15003	LOCKNUT 6-32 SS	A
3020505-AS DOCUMENT ONLY	-RF302 AMMETER ASBY	D
3021002	RF302 METER DIAL	A
42152	TERM RING #6 STAR TAB LUG	A
49243	SPACER MF 6-32X.500 SS BHX	A
92014	THERMOCOUPLE .5 AMP JUNCT	C
92030	METER,RAW	C
93021	LABEL SER# 1- 1/2x5/8	A

PLANT CODE: BIO-TEK REQUESTER: WOODSS

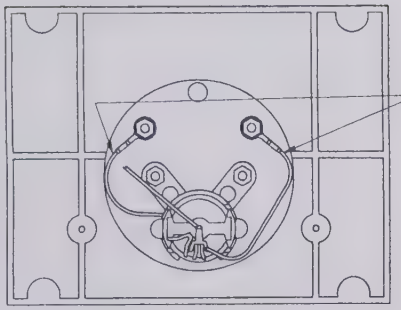
BILL OF MATERIALS REPORT PAGE NO: 1

BLY PART NUMBER, COMPONENT PART NUMBER

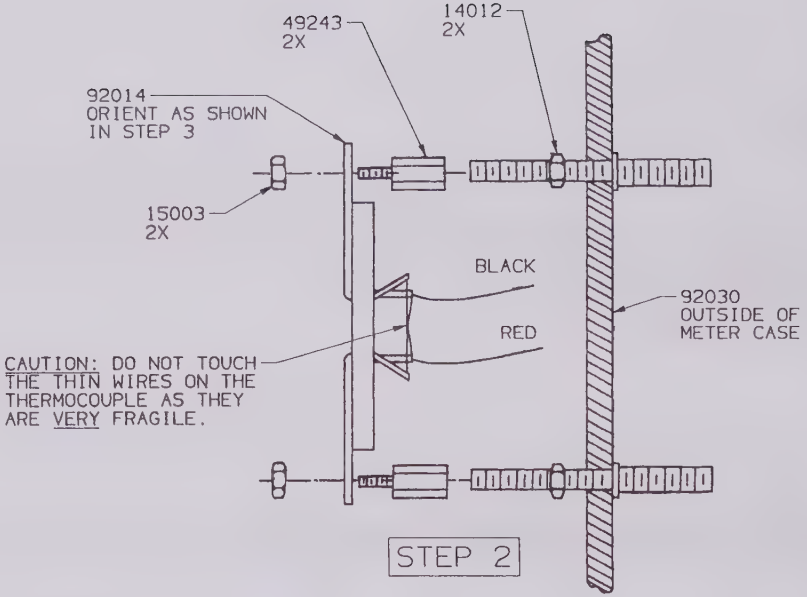
AS OF 03/20/95

X1 REV: E

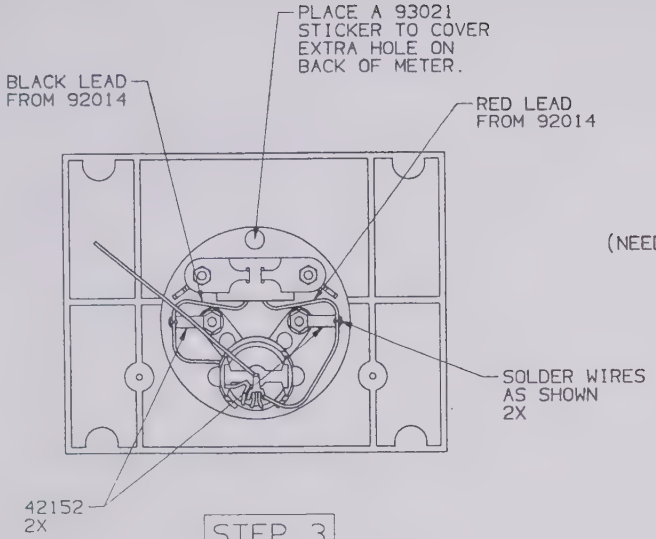
ITEM NUMBR	SC	ST UM	QTY PER ASSEMBLY	YIELD FACTR	OPER SEQ	OFFSET LD TIME FIXED	OFFSET LD TIME VARIABLE	EFFECTIV DATE	INACTIVE DATE
2	F4	EA	2.00	1.000	0	0	0.00	01/16/90	99/99/99
0	F4	EA	2.00	1.000	0	0	0.00	10/25/88	99/99/99
0	ED	EA	0.00	1.000	0	0	0.00	04/13/93	99/99/99
0	P3	EA	1.00	1.000	0	0	0.00	00/00/00	99/99/99
1	F4	EA	2.00	1.000	0	0	0.00	01/16/90	99/99/99
0	P2	EA	2.00	1.000	0	0	0.00	03/22/88	99/99/99
0	P4	EA	1.00	1.000	0	0	0.00	00/00/00	99/99/99
0	P3	EA	1.00	1.000	0	0	0.00	00/00/00	99/99/99
0	F4	EA	1.00	1.000	0	0	0.00	10/25/88	99/99/99



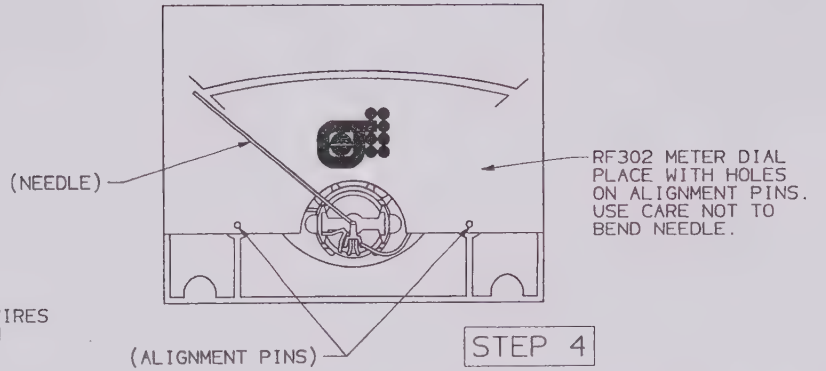
STEP 1



STEP 2



STEP 3



STEP 4

SNAP AMMETER COVER ON CASE

REV	DESCRIPTION	ECO	DATE	BY
D	REDRAW FOR WIRE ROUTING & ASBY	25137	5/31/94	BPS
C	CHG WIRES RED TO BLACK:BLACK TO RED	20015	4-13-93	CD
B	DELETE 14012 ADD 42152	12617	1-16-90	BLN
A	RELEASE TO ENGINEERING	10857	10-25-88	SL

UNLESS OTHERWISE SPECIFIED
ALL DIMENSIONS ARE IN INCHES
PRODUCTION TOLERANCES
.X±.015 ANGULAR TOL.±2°
.XX±.010
.XXX±.005
SURFACE FINISH 63

MATERIAL:

FINISH:

DO NOT SCALE

REMOVE ALL BURRS

BREAK SHARP EDGES

SIGNATURE	DATE
DRN BY: BLN	10-5-88
ENGR. J.SHIRLOCK	5/18/94
MGR:	

THIS DOCUMENT CONTAINS CONFIDENTIAL AND PROPRIETARY INFORMATION OF BIO-TEK INSTRUMENTS INC. AND NEITHER IT NOR THE INFORMATION CONTAINED THEREIN SHALL BE DISCLOSED TO OTHERS OR DUPLICATED OR USED FOR OTHERS WITHOUT EXPRESS WRITTEN CONSENT OF BIO-TEK INSTRUMENTS INC.

THIRD ANGLE PROJECTION

BIO-TEK INSTRUMENTS, INC.
HIGHLAND PARK, BOX 998
WINOOSKI, VT. 05404-0998

TITLE:
RF302 AMMETER ASBY

SIZE	DRAWING NO.	REV
C	3020505-AS	D

SCALE: NONE SHEET 1 OF 1

SORTED BY ASSEM

CLASS CODE: 809
B/M PRICELIST ACCESSORIES
PART: 3020600
DESC: RF302 LEAD SET UOM: EA SC:

COMPONENT PART/ REFERENCE INFO	DESCRIPTION	R
48016	LEAD 4' RED DUAL M BANA	A
48017	LEAD 4' BLACK DUAL M BANA	A
48157	LEAD 4' WHITE DUAL M BANA	A
48158	LEAD 5' GREEN DUAL M BANA	A

****

PLANT CODE: BIO-TEK REQUESTER: WOODSS

BILL OF MATERIALS REPORT PAGE NO: 1

BLY PART NUMBER, COMPONENT PART NUMBER

AS OF 03/20/95

19 REV: A

ITEM NUMBR	SC	ST UM	QTY PER ASSEMBLY	YIELD FACTR	OPER SEQ	-OFFSET- FIXED	LD TIME-- VARIABLE	EFFECTIV DATE	INACTIVE DATE
0	P2	EA	1.00	1.000	0	0	0.00	00/00/00	99/99/99
0	P2	EA	2.00	1.000	0	0	0.00	00/00/00	99/99/99
0	P2	EA	1.00	1.000	0	0	0.00	00/00/00	99/99/99
0	P2	EA	1.00	1.000	0	0	0.00	00/00/00	99/99/99

********END OF REPORT********